1.   (ORIGINAL) An apparatus for monitoring the condition of a tire comprising:

at least one sound monitoring device mountable on a vehicle, the sound monitoring device for producing a sound monitoring device output signal representative of the sound produced by at least one tire of the vehicle during rotation of the tire;

a signal processing device comprising a neural network for receiving and processing the sound monitoring device output signal, the signal processing device producing a processing device output signal representative of a potential damage condition of the tire; and

an indication device for receiving the processing device output signal and indicating to a user of the vehicle that the tire is experiencing the potential damage condition.

2.   (ORIGINAL) The apparatus of claim 1, wherein the indication device is selected from the group consisting of a lamp, a light emitting diode, a gage, and an audio indicator.

3.   (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of harmonics in the sound monitoring device output signal to known harmonics representative of the potential damage condition of the tire.

4.   (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of an amplitude for each harmonic frequency and a phase angle for each harmonic frequency in the sound monitoring device output signal to known amplitudes for each harmonic frequency and known phase angles for each harmonic frequency representative of the potential damage condition of the tire.

5.   (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of the sound represented by the sound

monitoring device output signal to known sound made by tires having various degrees of tread belt separation.

6. (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of the sound represented by the sound monitoring device output signal to known sounds made by tires having at least a different size, configuration, or manufacturer all having various degrees of tread belt separation.

7. (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of the sound represented by the sound monitoring device output signal to known sounds made by tires on different makes and model of vehicles having various degrees of tread belt separation.

8. (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of the sound represented by the sound monitoring device output signal to known sounds made by tires located in every wheel well of the vehicle having various degrees of tread belt separation.

9. (ORIGINAL) The apparatus of claim 1, wherein the signal processing device produces the processing device output signal upon comparison of the sound represented by the sound monitoring device output signal to known sounds made by tires having even tread wear having various degrees of tread belt separation, and tires having uneven tread wear having various degrees of tread belt separation.

10. (ORIGINAL) The apparatus of claim 1, wherein the vehicle has four tires and four wheel wells, and the sound monitoring devices are four in number and each located in one of the wheel wells proximate to a respective one of the four tires of the vehicle, and wherein the signal processing device produces the processing device output signal upon comparison of the sounds represented by the sound monitoring device output signals to known sounds made by tires

located in each of the four wheel wells of the vehicle having various degrees of tread belt separation.

11.   (CURRENTLY AMENDED) The apparatus of claim 1, wherein the indication device indicat~~inges~~ that the tire is experiencing a particular percentage of tread belt separation.

12.   (ORIGINAL) An apparatus for monitoring the condition of a tire comprising:

at least one sound monitoring device to be carried by a vehicle, the sound monitoring device for producing a sound monitoring device output signal representative of the sound produced by at least one tire of the vehicle during rotation of the tire;

a signal processing device comprising a neural network connected to receive the sound monitoring device output signal and comparing the sound represented by the sound monitoring device output signal to a known set of sounds produced by tires on the same make and model of the vehicle and having various degrees of tread belt separation, the signal processing device producing a processing device output signal upon detecting a predetermined degree of tread belt separation; and

an indication device for receiving the processing device output signal and indicating to a user of the vehicle that the tire is experiencing tread belt separation.

13.   (ORIGINAL) The apparatus of claim 12, wherein the signal processing device compares sounds by comparison of harmonics in the sound monitoring device output signal to known harmonics produced by tires on the same make and model of the vehicle having various degrees of tread belt separation.

14.   (ORIGINAL) The apparatus of claim 12, wherein the indication device is selected from the group consisting of a lamp, a light emitting diode, a gage, and an audio indicator.

15.   (ORIGINAL) The apparatus of claim 12, wherein the signal processing device compares the sounds by comparison of an amplitude for each harmonic frequency and a phase angle for

each harmonic frequency in the sound represented by the monitoring device output signal to known amplitudes for each harmonic frequency and known phase angles for each harmonic frequency representative of the sets of sounds produced by tires on the same make and model of the vehicle having various degrees of tread belt separation.

16. (ORIGINAL) The apparatus of claim 12, wherein the signal processing device compares the sound represented by the sound monitoring device output signal to a known set of sounds produced by tires having at least a different size, configuration, or manufacturer all having various degrees of tread belt separation.

17. (ORIGINAL) The apparatus of claim 12, wherein the signal processing device compares the sounds represented by the sound monitoring device output signal to known sounds made by tires located in every wheel well of the vehicle having various degrees of tread belt separation.

18. (ORIGINAL) The apparatus of claim 12, wherein the signal processing device compares the sound represented by the sound monitoring device output signal to known sounds made by tires having even tread wear having various degrees of tread belt separation, and tires having uneven tread wear having various degrees of tread belt separation.

19. (ORIGINAL) The apparatus of claim 12, further comprising a vehicle having four tires and four wheel wells, and wherein four sound monitoring devices are present and each located in one of the wheel wells proximate to a respective one of the four tires of the vehicle, and wherein the signal processing device comparing the sounds represented by the sound monitoring device output signals to known sounds made by tires located in each of the four wheel wells of the vehicle.

20. (ORIGINAL) The apparatus of claim 12, wherein the indication device indicates that the tire is experiencing a particular percentage of tread belt separation.

5

21. (PREVIOUSLY AMENDED) An apparatus for monitoring the condition of a tire comprising:

at least one sound monitoring device to be carried by a vehicle, the sound monitoring device for producing a sound monitoring device output signal representative of the sound produced by at least one tire of the vehicle during rotation of the tire;

a signal processing device comprising a neural network for receiving the sound monitoring device output signal and comparing the sound monitoring device output signal to sounds trained into the neural network from tires having various degrees of tread belt separation ~~on a vehicle of a particular make and model~~, the signal processing device producing a processing device output signal upon detecting a predetermined degree of tread belt separation; and

an indication device for receiving the processing device output signal and indicating to a user of the vehicle that a predetermined degree of tread belt separation is experienced by the tire.